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ABSTRACT

This document updates California's 1966 guidelines for school district determination of land size needs to support their education programs. The guide reflects the changes in educational programs that have affected school site usage and size requirements and includes recommended changes in site acreage for very large schools; equal access for female athletes; classroom size and class size reductions; the need for a master plan of the site and functional link between educational specifications and site size; and site requirements for county community schools, community day schools, and continuation high schools. Also provided are numerous dimensional figures for athletic fields and courts. The document's final section presents procedures for developing a site plan. Appendices contain a comparison of school site sizes for 1966 and 2000; and lists site requirements for small schools and elementary through high school facilities, county community schools, community day schools, and continuation high schools. (GR)

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Guide to School Site Analysis and Development

2000 Edition

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Preface

The California Department of Education establishes standards for school sites pursuant to *Education Code* Section 17251 and adopts school site regulations, which are contained in the *California Code of Regulations, Title 5*, commencing with Section 14001.

Site size standards were updated in 1999-2000 to reflect significant changes in education, such as class size reduction in kindergarten through grade three, implementation of the (federal) Education Amendments of 1977, Title IX (gender equity), parental and community involvement, and technology.

In addition to the educational reforms noted above, the expanded use of buildings and grounds for community use and agency joint use and legislative changes in the site-selection process regarding environmental, toxic, and other student and staff safety issues made it necessary to update the *Guide to School Site Analysis and Development*.

Local school districts have expressed appreciation for the guide as they carry out their responsibility to provide safe and educationally appropriate facilities for their children and communities.

This document was prepared by Duwayne Brooks, Director, School Facilities Planning Division; Robert Williams, principal writer; Sue Pendleton, Consultant; and other staff of the division.

SUSAN LANGE
Deputy Superintendent
Finance, Technology, and Administration Branch

Introduction

This edition of the *Guide to School Site Analysis and Development* assists school districts in determining the amount of land needed to support their educational programs in accord with their stated goals and in accord with recommendations of the California Department of Education. This edition also updates the guidelines, reflecting the changes in educational programs that have affected school site usage and size requirements. The study conducted by the original committee was so thorough that the methodology for determining acreage remained much the same as that used in the 1966 edition.

Types of Changes

Changes in recommended site acreage are primarily the result of legislation regarding class size reduction (CSR) and gender equity (Education Amendments of 1972, Title IX) issues that have a direct impact on site size. Title IX ensures equal access for female athletes; therefore, the acreage requirements have been increased for physical education in grades nine through twelve to include additional softball/soccer fields. Consequently, the playfield area increases from 1.4 acres to 3.4 acres, depending on the enrollment and the grade level. The area for buildings and grounds has been increased to conform to past increases in the allowable building area that were never reflected in the previous edition of this guide; the area for buildings and grounds and the area for parking and roads have also been increased to accommodate the increased number of classrooms and teachers due to CSR.

Classroom Size and Class Size Reduction

Although new legislation requires class size to be reduced, the total number of pupils in a given school remains the same; therefore, more classrooms are required. For example, an elementary school with 300 pupils in grades one through three with class sizes of 30 would require ten classrooms for those grades; whereas class sizes of 25 would require 12 classrooms, and class sizes of 20 would require 15 classrooms. A reduction in the number of pupils per classroom does not equal a reduction in the size of the classroom itself. For sound educational reasons the

Department of Education maintains its policy of recommending 960 square feet for a standard classroom and 1,350 square feet for a kindergarten room.

In a memorandum to school district and county superintendents dated May 1998, the School Facilities Planning Division made the following statement regarding classroom size:

> . . . The initial implementation of CSR may have required districts to use classrooms less than the standard 960 square feet (sf); however, the California Department of Education encourages districts to make every effort to maintain the physical size of elementary classrooms at 960 sf and 1,350 sf for kindergarten. In addition, districts should carefully consider support facilities and site size in implementing CSR.

The California Department of Education believes that a classroom of 960 square feet best supports CSR. If the classroom is too small, the full educational value of the lower class size may not be realized. A classroom of less than 960 square feet may not provide sufficient space for pullout programs, small-group work, or computer stations. Adequate area must be provided for furniture and technology, audiovisual equipment, student work areas, and storage. Additionally, classrooms must be large enough to allow movement and circulation, exiting, and access by students with disabilities.

In addition to maintaining the minimum 960-square-footage requirement for instructional reasons, districts should also consider maintaining 960-square-foot classrooms to retain flexibility in scheduling and reassigning classes between the first through third grades and the higher grades in the future. A small classroom (e.g., one that is 600 square feet) does not allow the classroom to be used for 30 students in grades four through six if the needs change at the school site. Smaller classrooms, although intended to be temporary, have a way of becoming permanent. California is already near the bottom of the list of states ranked according to the square footage of building space allowed per pupil.

Building Area per Pupil

Although the Leroy F. Greene School Facilities Act of 1998 does not prescribe allowable building area, the California Department of Education recommends that the size of schools be calculated at 59 square feet (the minimum) per pupil for kindergarten through grade six; at 80 square feet (the minimum) per pupil for grades seven and eight; and at an average of 92 square feet (the minimum) per pupil for grades nine through twelve, based on the former Lease-Purchase program.

Comparison of the 1966 and Current Editions

Table 1 shows a comparison of school site size recommendations between the time of the 1966 edition and the time of this edition of the guide.The rationale and methodology for calculating these changes are presented in this guide.

Site Requirements for Very Large Schools

Another difference between the 1966 edition and the current edition relates to acreage requirements for very large schools (see the appendix). Acreage requirements for schools of optimal size, as defined by the California Department of Education, are included in the guide. Although the Department does not recommend exceedingly large schools, some districts may desire to build schools that exceed the requirements detailed in Tables 3 through 6. Therefore, tables of acreage requirements for expanded sites have been provided in the appendix. Another use for

Table 1 Comparison of School Site Sizes, 1966 and 2000

Elementary School

	Without Class Size Reduction			With Class Size Reduction, K–3		
School enrollment	*Acres according to the 1966 edition*	*Acres according to the current edition*	*Percent increase*	*Acres according to the current edition*	*Percent increase over the current edition*	*Percent increase over the 1966 edition*
450	9.0	9.2	2	9.6	4	6
750	12.7	13.1	3	13.8	5	8
1,200	15.8	16.4	4	17.6	7	11

Middle School (with Track Facilities)

School enrollment	*Acres according to the 1966 edition*	*Acres according to the current edition*	*Percent increase*
600	17.4	17.4	0
900	20.8	20.9	0.5
1,200	22.5	23.1	3

High School

School enrollment	*Acres according to the 1966 edition*	*Acres according to the current edition*	*Percent increase*
1,200	31.3	33.5	7
1,800	39.7	44.5	12
2,400	46.5	52.7	13

the expanded site tables is to determine whether a site is overcrowded and may qualify for additional grants under *California Code of Regulations, Title 2*, sections 1859.73 and 1859.74.1, adopted pursuant to the Leroy F. Greene School Facilities Act of 1998.

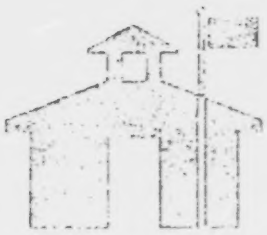
Other Changes

Additional changes in this edition include a discussion of the need for a master plan of the site and the functional link between educational specifications and site size. Land scarcity, urban location, excessive cost, and other site size limitations must be recognized; a discussion follows on how these limitations can be managed through good master planning and thorough educational specifications. Unusual and exceptional site conditions are defined, and a description of what constitutes usable acres has been added.

Finally, a new table (Table 7) has been added that provides the site requirements for county community schools, community day schools, and continuation high schools.

Use of Tables in Transition

The California Department of Education calculates the acreage required when the Field Site Review (SFPD Form 4.0) is submitted. School districts that selected sites during the revision period of the guide may find differences in site acreage requirements between the 1966 edition and this edition. If differences are found, the correct acreage will be determined on a case-by-case basis. Final site approval letters issued on or after November 30, 2000 (the date that *Title 5* regulations became effective) will use acreage standards set forth in the 2000 edition.



Section 1

Background

In 1966 the School Facilities Planning Division directed an empirical study of the land area required by California public schools to conduct their educational programs. This guide provides updated information using results of the study so that the educator, the architect, and the school planner can interpret the functions of the school site and determine the amount of land required for those functions.

Historical Perspective

Education has changed rapidly in the twentieth century and will continue to change in the twenty-first century. The way in which sites are developed and the resulting new school buildings will continue to reflect those changes.

Before the 1920s and 1930s, school districts usually bought very small sites because there was little perceived need for outdoor play areas. Then in the late 1920s and 1930s, there was a great surge of interest in physical education, leading to the realization that larger sites were necessary. Before this interest in physical education, many elementary schools with enrollments from 500 to 1,000 were built on one- or two-acre sites, and high schools with enrollments of 2,000 to 3,000 seldom had sites of more than ten acres. These sites were so small that it was impossible to provide more than a modicum of playground space or outdoor facilities for physical education, and there was no space to expand the existing plant.

Most of the elementary school buildings used during that period in the cities were two- or three-story block masonry buildings above rather high basement spaces, and they contained eight or more classrooms. The rooms were large to accommodate the very large class sizes so common then. The hazards of fire and evacuation of those schools were very great. Many of the buildings have been demolished because they were unsafe. The outdoor play areas were small and inadequate.

Mission Style

From the period roughly between World War I and World War II, great strides were made in the science of school planning. Following World War I the trend in California was toward mission-style architecture: the single-story elementary school, one classroom deep on an arcade or open corridor. During the same period schools were expanding their programs to include health and food service facilities, specialized administrative quarters, auditoriums, and libraries. The program expansion frequently included physical education programs that required outdoor education facilities, often occupying 50 to 80 percent of the site. The combination of single-story design and expanding educational programs resulted in the need for larger school sites.

"Finger" Plan

The mission-style school of the 1920s evolved into the "finger" plan school of the 1930s. This plan is characterized by building wings, usually 30 to 40 feet apart, that contain four or five classrooms in line with an open corridor on one side and an "outdoor classroom" on the other side. This architecture made possible the use of bilateral daylighting and cross-ventilation.

The louvers, baffles, and wide overhangs used for controlling daylight make those buildings easily identifiable. Many buildings are graceful plants with sheltered but noninstitutional characteristics. Generally, the buildings are located on ten-acre sites built for about 650 students. Refinements in this "finger" plan concept of elementary schools continued through the 1950s.

Cluster Plan and Open Space Plan

During the 1960s and 1970s, educators and architects questioned the basic configuration of the school and the classroom as a self-contained teaching station. Various patterns of cluster plans were developed that offered great interior flexibility within open space shells; team-teaching and large- and small-group instruction could be accommodated in a variety of patterns.

For various reasons the open space plan did not win wide or lasting acceptance and was soon modified to recapture the visual and sound separation provided by the self-contained classroom. The partial return in the 1980s and 1990s to the self-contained classroom combines the flexibility associated with the cluster and open space plans with the relative isolation of the self-contained classroom. This arrangement is accomplished with the use of movable walls, space-function adjacency design, scheduling innovations, and other creative design features.

Rule-of-Thumb Approach

For many years school districts and school planning agencies used a rule-of-thumb approach for determining school site sizes. It was recommended that elementary schools be provided a minimum site of five acres plus an additional acre for each 100 pupils of predicted ultimate enrollment. For middle schools the basic size was 15 acres, and for high schools the basic size was 15 to 20 acres plus, in both cases, an additional acre per 100 students of predicted ultimate enrollment. Calculation by the rule of thumb yields the following acreages:

Type of School	Number of Pupils	Site Size
Elementary	500	10 acres
Middle	1,000	25 acres
High	2,000	35–40 acres

The rule-of-thumb approach worked reasonably well in the early and mid-1900s when land was easily available and the cost of a school site was small compared with the cost of the building. However, during the last half of the twentieth century, when available land became scarce in urban areas and prices began to skyrocket, educators began rethinking the rule of thumb and started to explore more precise methods of determining the proper size of a school site.

Functional Approach

In the mid-1960s, as the importance of educational specifications was being recognized in the total facilities planning process, the California Department of Education developed a *functional approach* for determining the size of a school site. The approach was based on the amount of area required to support the functions or activities of the proposed educational program. This approach presumes that in order to determine the size of a school site, one must first study the following aspects of the proposed educational program:

- The ultimate predicted enrollment
- The grade levels to be served
- The type, number, size, function, special characteristics, and spatial relationships of instructional areas, administrational areas, and service areas
- The building design (e.g., compact campus style, multistory)
- On-site parking and bus loading/unloading requirements
- Outdoor physical education requirements
- Whether school-community joint-use programs will take place
- Whether child care facilities are needed
- Whether temporary relocatable structures are used

The soundness of the functional approach, expressed in the architectural principle that form follows function, has been proven over time and needs modification only where availability of land is scarce and real estate prices are exorbitant. In those cases the size of the school site may have to be reduced, but if so, the reduction should be done according to *educational program priorities.* The functional area requirements in this guide can serve to assist in the program modifications necessary to make the best use of a reduced site size in areas where land is scarce and costly.

Need for Increases in Recommended Site Size

Until now developments in school architecture did not require additional acreage. However, recent legislation has affected the educational program, requiring increased acreage. School design today is being affected not only by technology but also by such programs as class size reduction (CSR) and gender equity laws under the (federal) Education Amendments of 1972, Title IX, governing physical education. The new focus on student achievement and equal access requires specialized spaces and new building configurations and additional playfield areas.

Class Size Reduction

The CSR program has a direct impact on school design and land requirements. A school population of 600 at 20 students per classroom requires ten more classrooms and hence more land than the same population of 600 at 30 students per classroom.

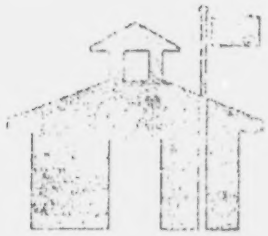
Although multistory buildings and a compact design may reduce the need for a larger building footprint, single-story buildings and campus-style layouts likely will continue to be the predominant design style for California schools in most communities. Given this situation, the California Department of Education has revised this guide to include an increase in site size to accommodate the added classrooms and/or building size required by CSR. (No increase in playfield area is required because of CSR.) The method of calculating this increase is discussed in the section "Land for a Developed Building Site" (see page 10).

Gender Equity

To ensure compliance with the Education Amendments of 1972, Title IX, the California Department of Education conducted a study of the adequacy of playfield areas that had been planned and constructed in accord with the Department's past guidelines. The results of this study indicated that the size of the site needed to be increased in some instances. This is discussed more fully under the section "Land for Outdoor Physical Education" (see page 8).

Other Program Changes

The demand for more building area is driven by other program changes, such as the emergence of full-scale media centers that replace single classroom-size libraries, large multipurpose buildings, technology centers, career centers, departmental offices, teacher workrooms, and child care centers on campus. In addition, the demand for parking is affected by the increased number of volunteers and teacher aides, the need for a bus loading and unloading zone separate from automobile traffic and student drop-off, and community involvement at the school site.



Section 2

School Site Requirements

This guide offers a valid technique for school administrators and governing boards of school districts to determine more accurately than was previously possible the acreage required for new schools. However, the task continues to be a do-it-yourself project for each school district. The formulas are flexible enough to permit each district to tailor its final answers as it wishes and as necessary to accommodate unusual or exceptional conditions.

The Site Master Plan and Educational Specifications

The School Facilities Planning Division recommends that prior to purchasing a site, the school district planner or its architect prepare a site utilization study based on the formulas in this guide to determine as accurately as possible the amount of land needed. This study should be performed in accord with the district's facility master plan for all existing and proposed sites and its educational specifications, as discussed under "Functional Approach" in Section 1.

The site utilization study should show the layout of the proposed buildings and grounds, parking area and roads, and playfield areas as well as future additions and the expansion necessary to accommodate the site's maximum proposed enrollment. This plan can serve as a decision-making tool in implementing various strategies.

For example, if a governing board buys less land than the recommended amount because of unusual site conditions (e.g., scarcity of land, size restrictions, excessive cost), it can determine from the site master plan and the educational specifications which components of the school program must be altered or eliminated.

Unusual Site Conditions

Unusual or exceptional site conditions are defined in the *California Code of Regulations, Title 5,* Chapter 13 of Division 1, Section 14010(a) and (b), as follows:

(a) The net usable acreage and enrollment for a new school site shall be consistent with the numbers of acres and enrollment established in the 2000 Edition, "School Site Analysis and Development" published by the California Department of Education and incorporated into this section by reference, in toto, unless sufficient land is not available or circumstances exist due to any of the following:

(1) Urban or suburban development results in insufficient available land even after considering the option of eminent domain.

(2) Sufficient acreage is available but it would not be economically feasible to mitigate geological or environmental hazards or other site complications which pose a threat to the health and/or safety of students and staff.

(3) Sufficient acreage is available but not within the attendance area of the unhoused students or there is an extreme density of population within a given attendance area requiring a school to serve more students on a single site. Choosing an alternate site would result in extensive long-term busing of students that would cause extreme financial hardship to the district to transport students to the proposed school site.

(4) Geographic barriers, traffic congestion or other constraints would cause extreme financial hardship for the district to transport students to the proposed school site.

(b) If a school site is less than the recommended acreage required in subsection (a) of this section, the district shall demonstrate how the students will be provided an adequate educational program, including physical education, as described in the district's adopted course of study.

Usable Acres

The tables for determining site requirements are based on net usable acres. Land rendered useless by cuts, easements, steep hills, gullies, creekbeds, large rock outcroppings, wetlands and marshland, and land in flooding areas are not considered usable. On sites where such land is present, total gross acres will necessarily exceed net usable acres. An excess of 30 percent of the site in unusable land may be a liability in acquisition costs, site development, and site maintenance except, perhaps, in the foothill and mountain areas where irregular topography is common and usage is adjusted accordingly.

Development of the Site Master Plan

The following factors were analyzed to determine the acreage required for the facilities needed on a school site and to permit the development of a workable and desirable layout:

- Outdoor physical education facilities
- Buildings, walkways, and landscaping
- Parking and access roads
- A percentage factor to facilitate the layout of the site master plan

The land required for the items noted above constitutes the total acreage required for the site. These factors and ways to calculate them are discussed in the following pages.

Land for Outdoor Physical Education

The physical education program of a school is the most influential factor in the determination of the amount of land necessary for the school program. If a well-planned and adequate physical education program is desired, the area required for its operation must be provided; and if the school site is to be used for community recreation, additional land should be considered. Any reduction in the land provided will require similar reductions of the physical education program or other functions. Community recreation needs can be met most economically by joint use of school sites and facilities and park district sites and facilities. Provisions for activities such as picnicking and outdoor theater presentations may be highly desirable. A few elementary schools and many high schools provide a summer recreational program of aquatics. The facilities used for the aquatics program are also used for the school's physical education program.

This study assumes an outdoor physical education program that complies with, but does not exceed, the legal requirements of the California *Education Code* and the (federal) Education Amendments of 1972, Title IX (gender equity law), and follows good practices that conform to recognized standards of adequacy now existing in California schools.

Elementary schools. The educational program of a school determines the facilities needed; therefore, the outdoor physical education activities conducted by a school must be identified. For *elementary school pupils,* the activities break down basically into rhythms, games, stunts and tumbling, and those involving the use of apparatus. The program may provide for the following activities:

Rhythms

Fundamental skills development
Creative rhythms
Singing games
Folk and square dancing

Games

Tag and running games
Ball games
Track and field
Individual and dual games (hopscotch, foursquare, skipping rope, and the like)

Stunts and tumbling

Rolling
Balancing

Activities requiring the use of apparatus

Climbing
Swinging
Balancing
Pushing and Pulling
Hanging

Most rhythm activities must take place on hard-surface areas, such as asphalt or concrete. Running games and ball games require turfed areas. Activities such as climbing, tumbling, and gymnastics, however, require the use of various apparatus on a soft or padded ground cover.

Good practice and safety require that appropriate instructional areas be constructed for the children of various age groups in schools with more than six classrooms. The general age-group pattern is kindergarten, grades one through three, and grades four through six. Hard-surfaced areas, turfed field areas, and apparatus areas should be provided for each group.

For schools with six classrooms or fewer, outdoor facilities should be combined. Therefore, there would be only one turfed field area, one hard-surface area, and one apparatus area for the entire school.

The California Department of Education conducted studies to determine the facilities and space allocation needed for physical education outdoor teaching stations for schools of various sizes. The analysis of activities and the scheduling for each class throughout the day resulted in a determination of what percentage of time children of various ages would likely spend in various programmed activities.

As a result of those studies, a teaching station was defined as a play area adequate for one class to be taught by one teacher at one time so that pupils waste no time waiting turns because of lack of space and facilities. The tables in this guide are based on this definition and therefore present a breakdown of actual space requirements and equipment for each required teaching station.

High schools. To ensure compliance with gender equity laws (Education Amendments of 1972, Title IX), the California Department of Education conducted a study of the adequacy of playfield areas that were planned and constructed under the Department's guidelines until the present. The study involved a sample of high schools throughout the state stratified by size; geographic location; and urban, suburban, and rural areas.

About two-thirds of the school districts surveyed reported that their field areas were inadequate to accommodate women's team sports. Smaller schools were usually able to offer equal access by scheduling and overlapping the use of playfields, but larger schools that scheduled two or three levels of softball (freshmen, junior varsity, and varsity) needed additional playfield space.

As a result of that study, an additional field area for grades nine through twelve has been added in this current edition. The added area includes a combined softball/soccer field (260' × 260') and a combined softball/touch football/soccer field (260' × 460'). Together with the percentage factor for layout, this configuration will add 1.4 to 3.4 acres to playfield areas, depending on the enrollment and the particular grade levels involved.

Land for a Developed Building Site

There are many ways to design a site master plan. School buildings may be spread out into wings, wrapped around courtyards, or blocked together into compact clusters. Many different patterns and forms have been implemented in California schools.

Land for the developed building site includes not only the land required for the buildings but also the land adjacent to the buildings, which may be developed as paved areas, walkways, lawn area, outdoor classrooms, or courtyards. For the purposes of this guide, such land is designated as the areas required for buildings and grounds. Excluded are the areas for parking, service areas, and outdoor physical education and recreation facilities.

An analysis of prior submitted plans reveals a pattern or ratio of approximately 2:1 between the developed grounds area around the buildings and the building areas themselves. Few schools, either elementary or secondary, are designed in such a way that the developed land area is more than twice the building area. In most instances it is slightly less. The School Facilities Planning Division believes that when the grounds exceed this ratio by an appreciable amount, the maintenance costs for landscaping increase beyond the budget of the average school district. In those cases where the developed grounds are extremely limited (e.g., some schools have replaced lawn areas with asphalt

paving), the total effect is a depressing and sterile school setting. Most districts provide well-kept and well-landscaped grounds even if maintenance costs require that the total grounds area be somewhat restricted.

The tables in this guide were developed on the assumption that the land purchased will permit a ratio of approximately 2:1 between the developed grounds and the building area.

Computation of the Area for Buildings and Grounds

In the past the area for the developed building site was computed on the basis of state-aid area allocations. These allocations are no longer in effect since the passage of the Leroy F. Greene School Facilities Act of 1998 (Senate Bill 50). The computations for buildings and grounds in Tables 2 through 6 and in the tables in the appendix are based on building allowances that were in effect up to 1998, exclusive of the extra allowance for portable buildings. These square footages are as follows:

For kindergarten and grades one through six: 59 square feet per pupil
For grades seven and eight: 80 square feet per pupil
For grades nine through twelve: 92 square feet per pupil[1]

Typical problem A: Assume a kindergarten-through-grade-six school with an anticipated enrollment of 640 pupils. At the 2:1 ratio, each pupil will generate 177 square feet (59' × 3') for the building plus adjacent grounds. Thus the school would need 113,280 square feet (177' × 640'), or about 2.6 acres, for the "developed building site" and about 0.3 acre to permit planning concepts that separate kindergarten from the rest of the facilities. As shown in Table 3, a total of 2.9 acres (0.5 acre for kindergarten, 1.2 acres for grades one to three; and 1.2 acres for grades four to six) would be needed.

Typical problem B: Assume a middle school, grades six to eight, with an anticipated enrollment of 750 pupils. At the 2:1 ratio, each pupil will generate 240 square feet for the building plus adjacent grounds. Thus the school would need 180,000 square feet, or about 4.1 acres, for the developed building site. (See Table 4 for this example.)

Added acreage for class size reduction. Those school districts planning for CSR will want to take into account the added acreage required for the extra classrooms or buildings necessitated by smaller classes. Table 3 indicates the site requirements for elementary schools with more than six classrooms. The table has been revised to include additional

[1] *Note:* Actual area allocation for grades nine through twelve varies from 91.5 square feet per pupil for an enrollment of 2,400 to 127 square feet per pupil for an enrollment of 400. The figure of 92 square feet per pupil applies to high schools with an enrollment of 1,600 to 2,400.

acreages for the developed grounds and building area as well as associated parking and roads at schools where CSR is in effect. Table 2 indicates site requirements for elementary school sites with fewer than seven classrooms. The requirements have not changed; the acreage is based on the number of classrooms. Therefore, any increase in classrooms because of CSR would automatically include increased acreage.

CSR is very limited in effect in grades seven through twelve; acreage increases for CSR in those grades are shown in the appendix. Those computations are subject to future reevaluation.

Determining additional acreage for implementing class size reduction. The following steps are used to determine the additional acreage required for CSR:

1. Determine the number of additional classrooms required.
2. Multiply the number of classrooms by 1,000 square feet (this figure is based on a 960-square-foot classroom; the actual area is slightly more than 1,000 square feet with overhangs and circulation area included).
3. Divide this product by 43,560 square feet to determine the acreage.

Example:

1. Assume that 300 pupils are in grades one through three and that CSR is in effect for a class of 30 pupils per classroom, reducing the size to 20 pupils per classroom.[2]

   a. The regular educational program requires ten classrooms (300 ÷ 30).

   b. The CSR program requires 15 classrooms (300 ÷ 20).

   Therefore, five additional classrooms are required.

2. Using the 2:1 ratio of developed grounds to building area, multiply as follows:

   5 × 1,000 sq. ft. × 3 = 15,000 sq. ft.

3. 15,000 sq. ft. ÷ 43,560 sq. ft. = 0.34 acre

Table 3 for kindergarten-through-grade-six schools has been revised to include an increase in area due to CSR for buildings and grounds and for parking and roads. No calculation is needed for kindergarten because acreage in that table is already based on the number of classrooms and can easily be added to acreage for grades one through three to determine a total kindergarten-through-grade-three figure.

[2] In practice class loading has varied widely—some classes number more than 30; some, less than 30. Prior to Senate Bill 50, the accepted loading standard for grades one through three was 29 average daily attendance (a.d.a.), where a.d.a. was computed at 97 percent of enrollment. An a.d.a. of 29 equals 29.9 enrollment. Therefore, for practical purposes, an enrollment of 30 pupils is used in this example.

Example:

Refer to Table 3 and assume 300 students are in grades one through three of a school where CSR is in effect. In the column "151 to 300," 1.2 acres is indicated for the regular educational program on the "Building and grounds" line. On the line "Added acreage for buildings and grounds" for CSR, 0.3 acre is indicated. The added parking and roads acreage under CSR may be found in a similar manner. In this example the total acreage for grades one through three *without* CSR in effect is 2.8. The total acreage *with* CSR in effect is 3.2. (CSR has *no* effect on acreage for physical education.)

Data on schools with CSR in effect for grades six through twelve are shown in Tables 4, 5, and 6.

Land for Parking and Access Roads

Typically, areas for parking and bus loading, access roads, and fire and service roads are required of most schools. The minimum parking provided for a one-classroom school is generally space for five to six cars, or five parking spaces for the public and one space for the teacher. Parking areas for small schools are arranged so that these schools use a combined parking area and bus loading area. The minimum space required for this arrangement is about 0.3 acre plus 380 square feet for each auto stall and access roads.

Parking at elementary and middle schools. When this guide was first published, larger elementary schools and middle schools generally provided one and one-half parking spaces for each teacher and each staff member. Under the former formula, an 18-classroom elementary school would have parking for 18 teachers, one principal, one office support staff member, and ten extra spaces for visitors and teacher aides, or 30 spaces.

In recent years the number of teacher aides and other staff members has increased so that the former formula is outmoded. A more up-to-date formula that better reflects current practice would provide 2.25 parking spaces for each teaching station. This would include space for staff members and visitors. Under this new formula an elementary school of 18 classrooms would have 40 parking spaces. These additional ten spaces are the minimum needed to accommodate the increased number of teacher aides, staff members, and visitors at schools today.

Required area for parking and buses. If the parking and bus loading areas for a school are designed separately, the architect may plan to use about 15,000 square feet for the bus loading areas plus 380 square feet for each parking space and access roads. A kindergarten-through-grade-six school requiring 30 parking spaces would therefore require about

15,000 square feet plus 11,400 square feet, or a total of 26,400 square feet. This total is approximately 0.6 acre. Included in this figure is the land around parking lots, the land between the parking lots, the turnarounds, drop-off areas, service areas, and the frontal street. The parking acreage requirements developed for kindergarten and grades one through eight in any combination include those elements (see Tables 3, 4, and 5).

Student parking at secondary schools. Secondary schools generally provide additional land for student parking. This provision allows students who drive cars to park on the school site rather than occupy street parking throughout a neighborhood. When student parking areas are located to permit use by the public attending athletic events or community events, more land than is needed for student parking must be provided as determined by the capacity of the gymnasium, stadium, or auditorium. In the past many school districts provided student lots with a minimum parking capacity calculated on 50 percent of the school enrollment. Thus a high school of 2,000 students would provide parking for 1,000 cars at 380 square feet per car—an area of 380,000 square feet or about 8.7 acres of land—in addition to the space needed for staff and visitor parking. The number of students driving cars differs for each school, but this amount of land is usually adequate for all school purposes.

The recommended total area requirements for secondary school parking include student parking, staff parking, access roads, land around and between parking lots, turnarounds, drop-off areas, service areas, and the frontal street (see Table 6).

Percentage Factor for Layout

Usually, it is not possible to lay out required facilities such as playfields, which have critical dimensions and also critical relationships to other elements of the master plan, in such a way that all elements fit together neatly as pieces in a jigsaw puzzle. Even if that were possible, it would not be desirable. Rectangular elements would require a rectangular site of exact dimensions. Any natural attribute of the site, such as trees or knolls, would be sacrificed. There would be no space between various play areas for safety lanes or buffer areas to permit large groups of children to move freely on the site. And every site should have free space for the small, undefined activities that invariably become necessary as the school is used. Outdoor instruction areas and nature study activities are valuable assets. Younger children need garden spaces, digging areas, and other space for imaginative and creative play.

The tables for determining site requirements include a percentage factor that takes into account the various requirements and permits the layout of the programmed facilities. This factor varies from 30 percent

for very small schools to 10 percent for large schools. The percentage factor varies because schools tend to grow and because the more elements that are planned on a site, the greater is the efficiency possible in placing these elements within the site boundaries.

How to Use the Tables and Layouts

The tables in Section 3 contain information about the facilities and the amount of land needed to serve a specified number of grade levels and school enrollment. The suggested site acreage is based on the total area required for facilities, including land for buildings, parking, and outdoor physical education spaces. Each of the various outdoor physical education spaces is represented by a letter that is keyed to the layout of the facility. A number before a letter indicates the number of units of the physical education facilities required. Layouts for the various types of physical education facilities are presented with their correct dimensions. Tables are organized according to the number of classrooms or grade levels at a school.

Table 2 contains data for schools with fewer than seven classrooms. Small schools are a necessity in many areas in California that are sparsely populated and isolated. These small schools, however, pose special problems. The site factors, including outdoor physical education facilities and parking, are minimal. The outdoor spaces are compromised by necessity because pupils of various age groups must use the same facilities.

Table 3 contains data for elementary schools with more than six classrooms. The outdoor facilities required for the schools are suited to the grade level of the pupil enrollment. The table is divided to show the outdoor areas required for kindergarten activities; the outdoor facilities for grades one, two, and three; and those required for grades four, five, and six. Adjustments in acreage related to the implementation of CSR are on separate lines.

Table 4 contains data for schools with grades six through eight or solely seven and eight. When grade six is added to a school with grade seven or grades seven and eight to form a middle school, the outdoor facility requirements for grade six enrollment are considered the same as those for grades seven and eight. When grades five and six or grades four through six are placed in combination with upper grades to form groupings commonly referred to as middle schools, the outdoor facility requirements for grades four through six shall be determined by the table for elementary schools. Acreages related to the implementation of CSR are on separate lines.

Table 5 contains data for schools with grades six through nine, including area requirements for football and/or track facilities. When grade

nine is included with the upper elementary grades, the requirements for space and facilities increase appreciably because the ninth-grade programs usually introduce some of the physical education activities commonly associated with a high school. Even though a school that includes grade nine does not offer a program requiring facilities such as a track or a baseball field, land should be purchased that would permit those activities to be introduced in the program in the future. Acreages related to the implementation of CSR are on separate lines.

Table 6 contains data for high schools. This table should be used to determine the site requirements for grades nine, ten, eleven, and twelve or any combination of those grades. Acreages related to the implementation of CSR are on separate lines.

Table 7 contains data for county community schools, community day schools, and continuation high schools. The table includes acreage requirements for those types of schools, but that does not imply that they can share the same site. Generally, they cannot (see *Education Code* Section 48661). The data for those schools are combined in one table because the acreage requirements are the same.

Tables A.2, A.3, and A.4 in the appendix rely on Tables 3, 4, 5, and 6 and show the acreage requirements for very large schools, grades one through twelve, with CSR in effect.

The tables in this guide are designed so that the same procedure employed in using one table (except for Table 7) may be employed in using all the other tables. This procedure is illustrated through the following hypothetical problem that uses the table for elementary schools with more than six classrooms (Table 3).

Example

Step 1. Determine the age groups to be served.

For example, assume that the school to be planned will provide for children of kindergarten age and those in grades one through six. The projected enrollment is 600.

Step 2. Determine the projected enrollments in kindergarten; grades one, two, and three; and grades four, five, and six.

Enrollment for kindergarten (up to 50 pupils may be taught in one classroom in two half-day sessions)	84
Enrollment for grades one, two, and three	258
Enrollment for grades four, five, and six	258
Total	600

Step 3. Refer to the appropriate column to determine the acreage required.

a. In the column titled "Number of Classrooms," find the land requirement for two kindergarten classes: ..... 0.5 acre

If CSR requires a third kindergarten classroom, add: ..... *0.3 acre*

(Up to 40 pupils may be taught in one classroom in two half-day sessions.)

b. In the column titled "Enrollment 151 to 300," find the land requirement for grades one, two, and three: ..... 2.8 acres

If CSR is in effect in grades one, two, and three, add the following acreage for:

Buildings and grounds ..... *0.3 acre*

Parking and roads ..... *0.1 acre*

c. In the column titled "Enrollment 151 to 300," find the land requirement for grades four, five, and six: ..... 5.9 acres

If CSR is in effect in grades four, five, and six, add the following acreage for:

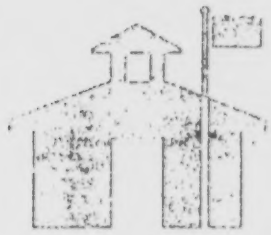
Buildings and grounds ..... *0.3 acre*

Parking and roads ..... *0.1 acre*

d. If CSR is in effect for only a portion of any grade-level grouping, look in the appropriate enrollment columns to find the acreages.

Total (K–6 without CSR) ..... 9.2 acres

Total (K–6 with CSR) ..... *10.3 acres*



Section 3

Layouts of Facilities

For each of the facilities noted by a letter in the tables, illustrations and the dimensions are provided in the layouts on pages 26 through 38. This information may be useful to architects. For example, if an architect wants to know the hardcourt requirements for up to 300 pupils in grades four, five, and six, he or she should refer to figure 10, which indicates that an area of 32,000 square feet is required for 300 pupils. Basic Unit F (see fig. 9) is a space module of 80 feet by 100 feet, and four of these units are required for the hardcourt area. These four modules may be blocked into various geometric patterns or planned as separate units. Therefore, the layout shown in figure 10 should be treated as being only one of many possible layouts.

The illustration shown in figure 10 also suggests that the hardcourt area provide for four basketball courts, six volleyball courts, and an area for miscellaneous games, such as tetherball, hopscotch, foursquare, and shuffleboard. The architect may arrange these areas to solve a particular problem, as necessary, to meet program requirements. He or she may also design a special layout suited to the area if the appropriate number of modules is included, the facilities are identified, and the dimensions are provided.

Table 2 Site Requirements for Small Schools

Grades one through six	*Number of classrooms*					
	1	*2*	*3*	*4*	*5*	*6*
Type of outdoor facility	*Number of facilities required*					
A Field area 90' × 120'				1	2	1
B Hardcourt area 60' × 75'			1	1	1	1
C Apparatus area (3,200 sq. ft.)	1	1	1	1	1	1
D Field area 180' × 180'	1	1	1	1	1	2
F Hardcourt area 80' × 100'	0.5	1	1	1	1.5	1.5
Percentage factor for layout	30	30	30	25	25	20
Area use	*Number of usable acres required*					
Physical education	1.2	1.3	1.4	2.0	2.4	2.7
Buildings and grounds	0.2	0.3	0.4	0.5	0.6	0.7
Parking and roads	0.3	0.3	0.4	0.4	0.4	0.4
Total acres	1.7	1.9	2.2	2.9	3.4	3.8

Grades one through eight	*Number of classrooms*					
	1	*2*	*3*	*4*	*5*	*6*
Type of outdoor facility	*Number of facilities required*					
A Field area 90' × 120'				1	2	1
B Hardcourt area 60' × 75'			1	1	1	1
C Apparatus area (3,200 sq. ft.)	1	1	1	1	1	1
D Field area 180' × 180'	1	1	1	1	1	2
F Hardcourt area 80' × 100'	0.5	1	1	1	1.5	1.5
G Field area 260' × 260'	1	1	1	1	1	1
Percentage factor for layout	30	30	30	25	25	20
Area use	*Number of usable acres required*					
Physical education	2.2	2.3	2.5	2.7	2.8	3.0
Buildings and grounds	0.2	0.3	0.4	0.5	0.6	0.7
Parking and roads	0.3	0.3	0.4	0.4	0.4	0.4
Total acres	2.7	2.9	3.3	3.6	3.8	4.1

Note: Small schools are defined as those with fewer than seven classrooms. The information in Table 2 requires no adjustment for class size reduction because it is based on the number of classrooms, not the size of enrollment. Adjustment automatically occurs when the number of classrooms increases.

Table 3 Site Requirements for Elementary Grades (In Schools with More Than Six Classrooms)

Kindergarten	*Number of classrooms*	
	1	*2*
Type of outdoor facility (in square feet)		
Turfed area	3,000	5,500
Paved area	2,000	4,000
Apparatus area	2,000	2,500
Land required for buildings and grounds	2,800	4,000
Total square feet required	9,800	16,000
Percentage factor for layout	20	20
Total usable acres required	0.3	0.5

Notes:

1. For CSR in kindergarten, increase the acreage as the number of classrooms increases.
2. If the school includes grades seven and eight or seven through nine, see Tables 4 and 5 for the increased acreage requirement.

Type of outdoor facility	
A Field area 90' × 120'	
B Hardcourt area 60' × 75'	
C Apparatus area (3,200 sq. ft.)	
D Field area 180' × 180'	
E Field area 120' × 180'	
F Hardcourt area 80' × 100'	
Percentage factor for layout	
Area use	
Physical education	
Buildings and grounds	
Parking and roads	
Total acres without CSR	
Class size reduction	
Added acreage for buildings and grounds	
Added acreage for parking and roads	
Total acres with CSR	

[redacted]

	Grades one through three					Grades four through six				
	Enrollment					*Enrollment*				
	Up to 75	*76 to 150*	*151 to 300*	*301 to 450*	*451 to 600*	*Up to 75*	*76 to 150*	*151 to 300*	*301 to 450*	*451 to 600*
	Number of facilities required					*Number of facilities required*				
	1	1	2	2	4					
	1	2	4	6	8					
	1	2	3	4	5	1	2	3	4	4
						1	2	4	4	4
									2	4
						1	2	4	6	8
	15	15	10	10	10	20	15	10	10	10
	Usable acres required					*Usable acres required*				
	0.5	0.7	1.3	1.9	2.4	1.2	2.4	4.4	6.0	7.4
	0.3	0.6	1.2	1.8	2.4	0.3	0.6	1.2	1.8	2.4
	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.4	0.4
	1.1	1.6	2.8	4.1	5.2	1.8	3.3	5.9	8.2	10.2
	0.1	0.2	0.3	0.5	0.7	0.1	0.2	0.3	0.5	0.7
	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.2
	1.3	1.9	3.2	4.8	6.1	2.0	3.6	6.3	8.9	11.1

Table 4 Site Requirements for Grades Six Through Eight

	Enrollment								
	Up to 75	*76 to 150*	*151 to 300*	*301 to 450*	*451 to 600*	*601 to 750*	*751 to 900*	*901 to 1,050*	*1,051 to 1,200*
Type of outdoor facility	*Number of facilities required*								
G Field area 260' × 260'	1	1							
H Field area 260' × 460'			1	1	1	1	2	2	2
I Field area 240' × 300'					1	1			1
J Hardcourt area 90' × 100'	1	2	3	3	4	4	5	5	6
K Hardcourt area 100' × 120'				2	2	3	3	3	3
P Apparatus area (1,000 sq. ft.)	1	2	2	3	3	3	4	4	4
Percentage factor for layout	30	30	25	25	20	20	15	15	15
Area use	*Number of usable acres required*								
Physical education	2.3	2.7	4.3	5.0	7.0	7.3	8.5	8.5	10.7
Buildings and grounds	0.6	1.4	2.1	2.7	3.3	4.1	4.9	5.8	6.6
Parking and roads	0.3	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.8
Total acres without CSR	3.2	4.4	6.7	8.1	10.7	11.9	14.0	15.0	18.1
Class size reduction	*Number of usable acres added*								
Added acreage for buildings and grounds	0.1	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4
Added acreage for parking and roads	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4
Total acres with CSR	3.4	4.7	7.1	8.8	11.6	12.9	15.3	16.6	19.9

Note: These specifications are intended for grades six, seven, and eight or a combination of grades seven and eight. If facilities for football and track are not required, use the specifications on this table; if they are required, see the specifications in Table 5.

Table 5 Site Requirements for Grades Six Through Nine

	Enrollment								
	Up to 75	*76 to 150*	*151 to 300*	*301 to 450*	*451 to 600*	*601 to 750*	*751 to 900*	*901 to 1,050*	*1,051 to 1,200*
Type of outdoor facility	*Number of facilities required*								
G Field area 260' × 260'			1		1	1			
H Field area 260' × 460'				1			1	1	1
J Hardcourt area 90' × 100'	1	2	3	3	4	4	5	5	6
K Hardcourt area 100' × 120'				2	2	3	3	3	3
L Field area 360' × 360'	1	1	1	1	1	1	1	1	1
M Field area 300' × 750'					1	1	1	1	1
P Apparatus area (1,000 sq. ft.)	1	2	2	3	3	3	4	4	4
Percentage factor for layout	30	30	25	25	20	20	20	20	20
Area use	*Number of usable acres required*								
Physical education	4.2	4.5	6.5	8.7	13.4	13.7	15.4	15.4	15.7
Buildings and grounds	0.8	1.6	2.3	3.0	3.6	4.2	4.9	5.8	6.6
Parking and roads	0.3	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.8
Total acres without CSR	5.3	6.4	9.1	12.1	17.4	18.4	20.9	21.9	23.1
Class size reduction	*Number of usable acres added*								
Added acreage for buildings and grounds	0.1	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4
Added acreage for parking and roads	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4
Total acres with CSR	5.5	6.7	9.5	12.8	18.3	19.6	22.2	23.5	24.9

Note: These specifications are intended for any combination of grades six, seven, eight, and nine and include area requirements for football and track.

Table 6 Site Requirements for Grades Nine Through Twelve

	Enrollment										
	Up to 400	*401 to 600*	*601 to 800*	*801 to 1,000*	*1,001 to 1,200*	*1,201 to 1,400*	*1,401 to 1,600*	*1,601 to 1,800*	*1,801 to 2,000*	*2,001 to 2,200*	*2,201 to 2,400*
Type of outdoor facility	*Number of facilities required*										
G Field area 260' × 260'	1	1		1	1						
H Field area 260' × 460'			1	1	1	2	2	3	3	3	3
K Hardcourt area 100' × 120'	2	2	3	3	3	3	3	3	4	4	4
L Field area 360' × 360'	1	1	1	1	1	1	1	1	1	1	1
M Field area 300' × 750'	1	1	1	1	1	1	1	1	1	1	1
N Hardcourt area 100' × 110'	3	4	5	5	6	6	6	7	7	7	8
O Field area 200' × 360'		1	1	1	1	1	1	1	1	2	2
P Apparatus area (1,000 sq. ft.)	2	3	3	4	4	5	5	6	6	7	7
Percentage factor for layout	25	20	20	20	20	15	15	15	15	10	10
Area use	*Number of usable acres required*										
Physical education	13.8	15.6	17.6	19.5	19.8	20.4	20.4	23.9	24.2	25.0	25.3
Buildings and grounds	3.3	4.0	5.1	6.3	7.6	8.9	10.1	11.4	12.7	13.9	15.2
Parking and roads	2.1	3.6	4.4	5.2	6.1	7.1	8.2	9.2	10.2	11.2	12.2
Total acres without CSR	19.2	23.2	27.1	31.0	33.5	36.4	38.7	44.5	47.1	50.1	52.7
Class size reduction	*Number of usable acres added*										
Added acreage for buildings and grounds	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.1	2.3
Added acreage for parking and roads	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.6	0.7
Total acres with CSR	19.7	24.0	28.1	32.3	35.0	38.2	40.8	46.8	49.7	52.8	55.7

Note: If field area L, Baseball Field, includes bleachers and dugouts, the site should be increased 0.3 acre.
If field area M, Football Field and Track, includes a stadium, the site should be increased 1.7 acres.
If the school program includes aquatics and requires both swimming and diving pools, the site should be increased 0.6 acre.

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Table 7 Site Requirements for County Community Schools, Community Day Schools, and Continuation High Schools

	Enrollment						
	5 to 20	*21 to 40*	*41 to 60*	*61 to 90*	*91 to 120*	*121 to 150*	*Over 150*
Area use	*Number of square feet and usable acres required*						
Buildings and grounds (in sq. ft.)	5,000	10,000	15,000	20,000	28,000	34,000	34,000 plus 200 sq. ft. per pupil for each pupil in excess of 150
Parking and roads (in sq. ft.)	8,000	16,000	24,000	36,000	48,000	60,000	400 sq. ft. per pupil for the total number of pupils
Physical education (in sq. ft.)	16,000	16,000	24,000	36,000	48,000	60,000	400 sq. ft. per pupil for the total number of pupils
Total sq. ft. recommended	29,000	42,000	63,000	92,000	124,000	154,000	
Acres	0.7	1.0	1.5	2.2	2.9	3.6	

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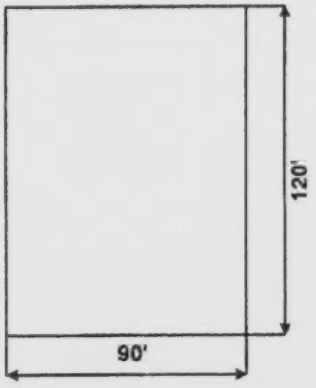
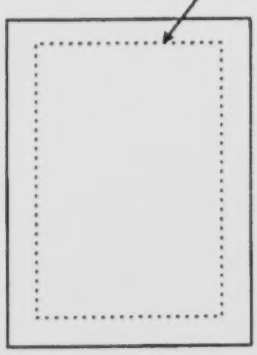
Fig. 1. Basic Unit A



BASIC UNIT A

SPACE MODULE 90' X 120'

Instructor may mark courts with chalk lines to make 1 teaching station of end soccer 60' x 100'.



or
1 teaching station of 2 hand polo courts 40' x 60' or other field games as desired for grades 1, 2, 3

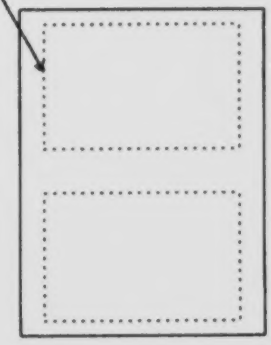
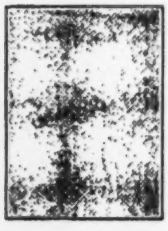


Fig. 2. Field Areas for Grades 1, 2, and 3

UNIT A

90'

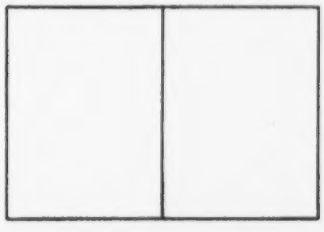
120'



UP TO 150 ENROLLMENT

10,800 sq. ft.

2 UNITS OF A



300 MAXIMUM ENROLLMENT

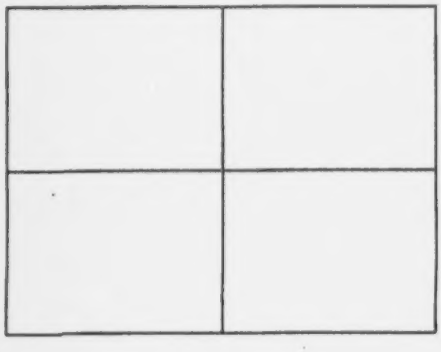
21,600 sq. ft.

3 UNITS OF A

450 MAXIMUM ENROLLMENT

32,400 sq. ft.

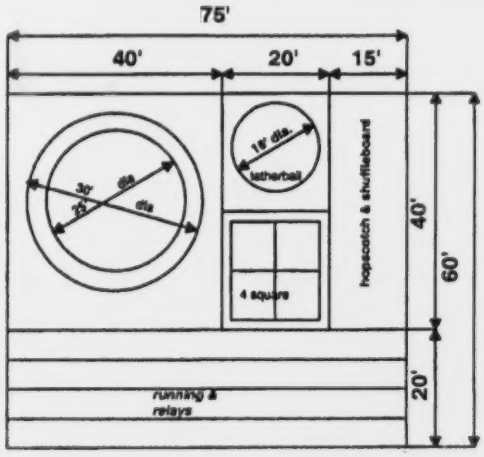
4 UNITS OF A



600 MAXIMUM ENROLLMENT

43,200 sq. ft.

Fig. 3. Basic Unit B

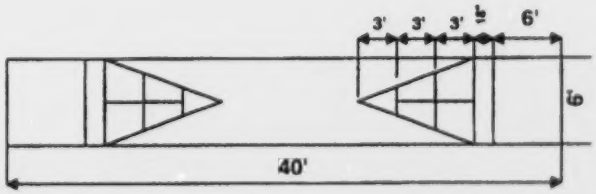


BASIC UNIT B

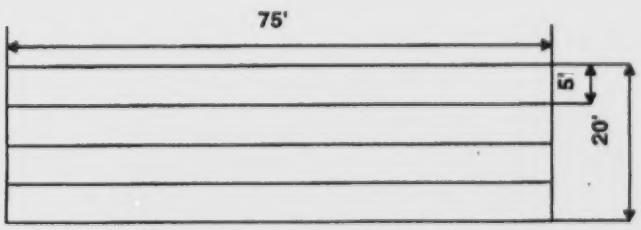
SPACE MODULE 60' x 75'

Showing typical activities for 75 children

LAYOUT WILL VARY

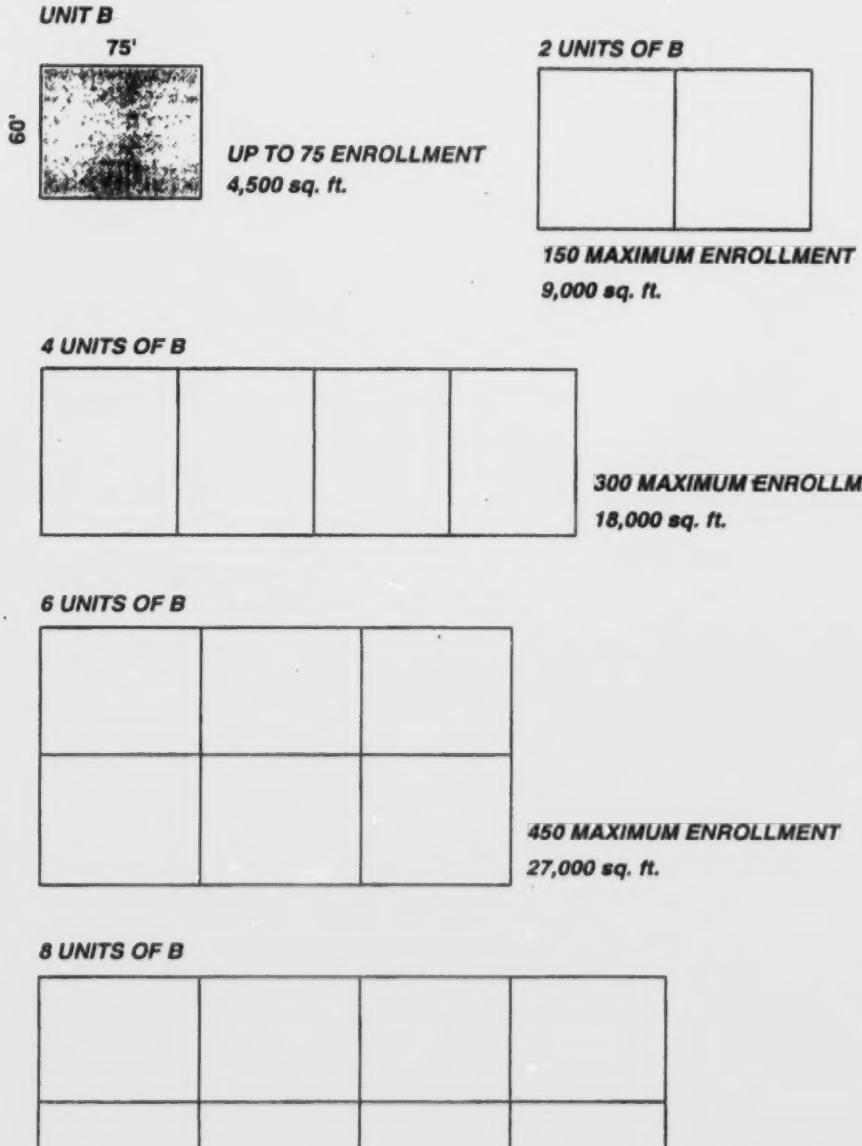


SHUFFLEBOARD



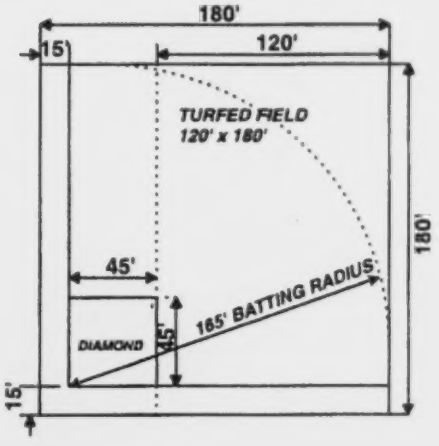
RUNNING AND RELAYS

Fig. 4. Hardcourt Areas for Grades 1, 2, and 3



Basic Unit C, an apparatus area, is a space module of 3,200 square feet. The architect may design the area according to the dimensions of the particular type of apparatus to be installed as long as the total area does not exceed 3,200 square feet. Basic Unit C provides space for up to 75 students in grades one through six. (See Table 3 for additional basic units needed for enrollments beyond 75 in those grades.)

Fig. 5. Basic Unit D

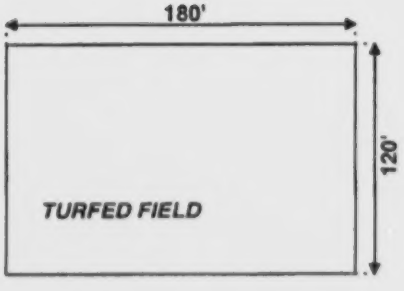


BASIC UNIT D

SPACE MODULE 180' x 180'

Combined use for softball or field areas

Fig. 6. Basic Unit E

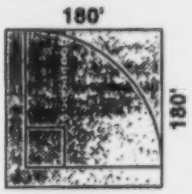


BASIC UNIT E

SPACE MODULE 120' x 180'

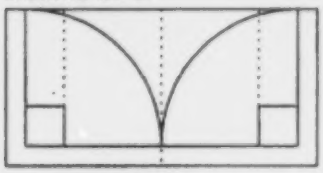
Fig. 7. Field Areas for Grades 4, 5, and 6

UNIT D



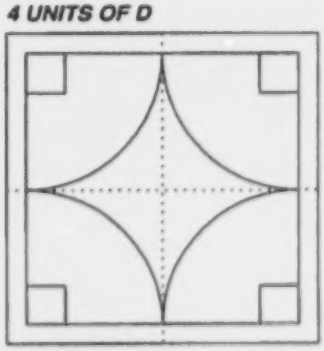
UP TO 75 ENROLLMENT
32,400 sq. ft.

2 UNITS OF D



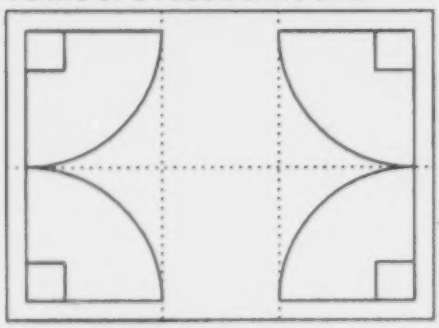
150 MAXIMUM ENROLLMENT
64,800 sq. ft.

4 UNITS OF D



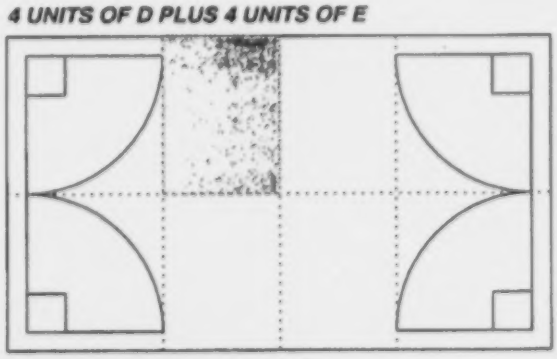
300 MAXIMUM ENROLLMENT
129,600 sq. ft.

4 UNITS OF D PLUS 2 UNITS OF E



450 MAXIMUM ENROLLMENT
172,800 sq. ft.

4 UNITS OF D PLUS 4 UNITS OF E



600 MAXIMUM ENROLLMENT
216,000 sq. ft.

Fig. 8. One-Half Unit F

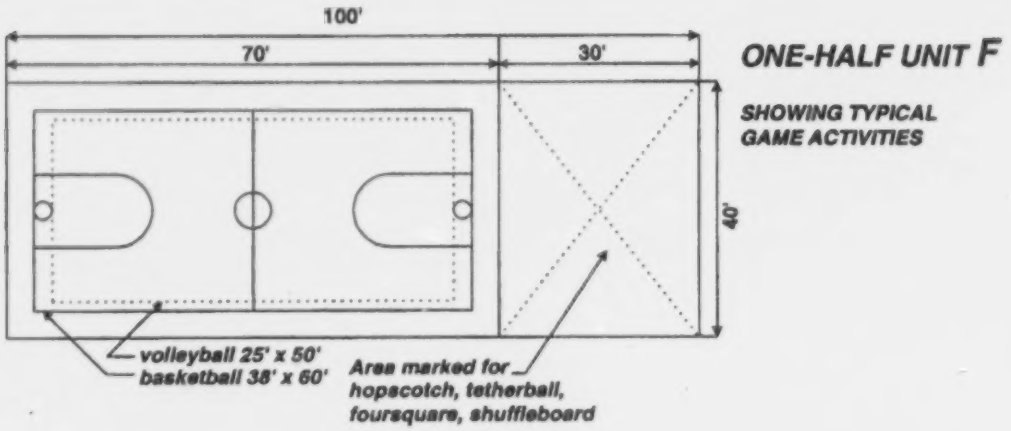


Fig. 9. Basic Unit F

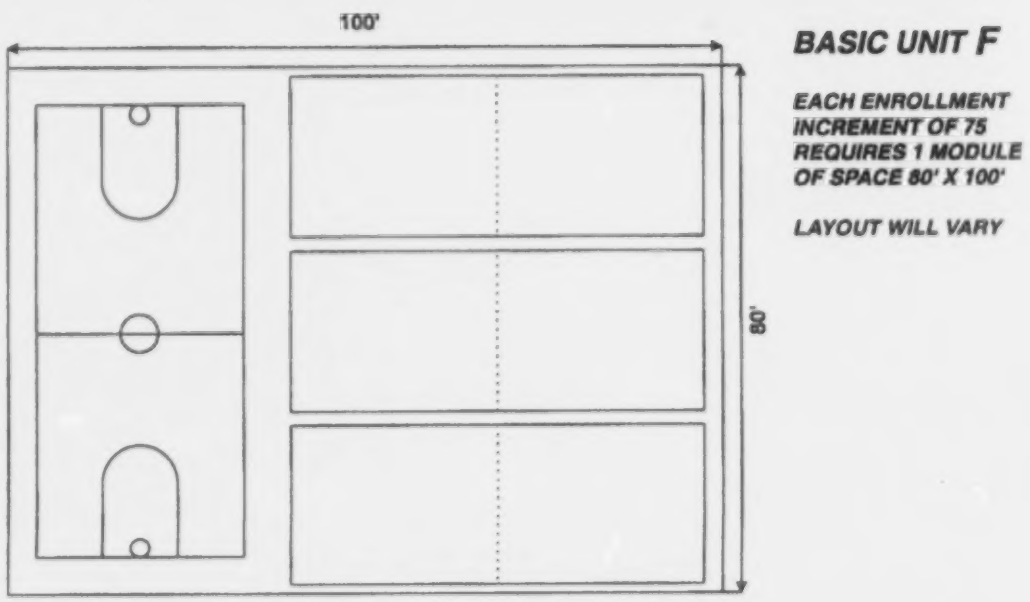


Fig. 10. Hardcourt Areas for Grades 4, 5, and 6

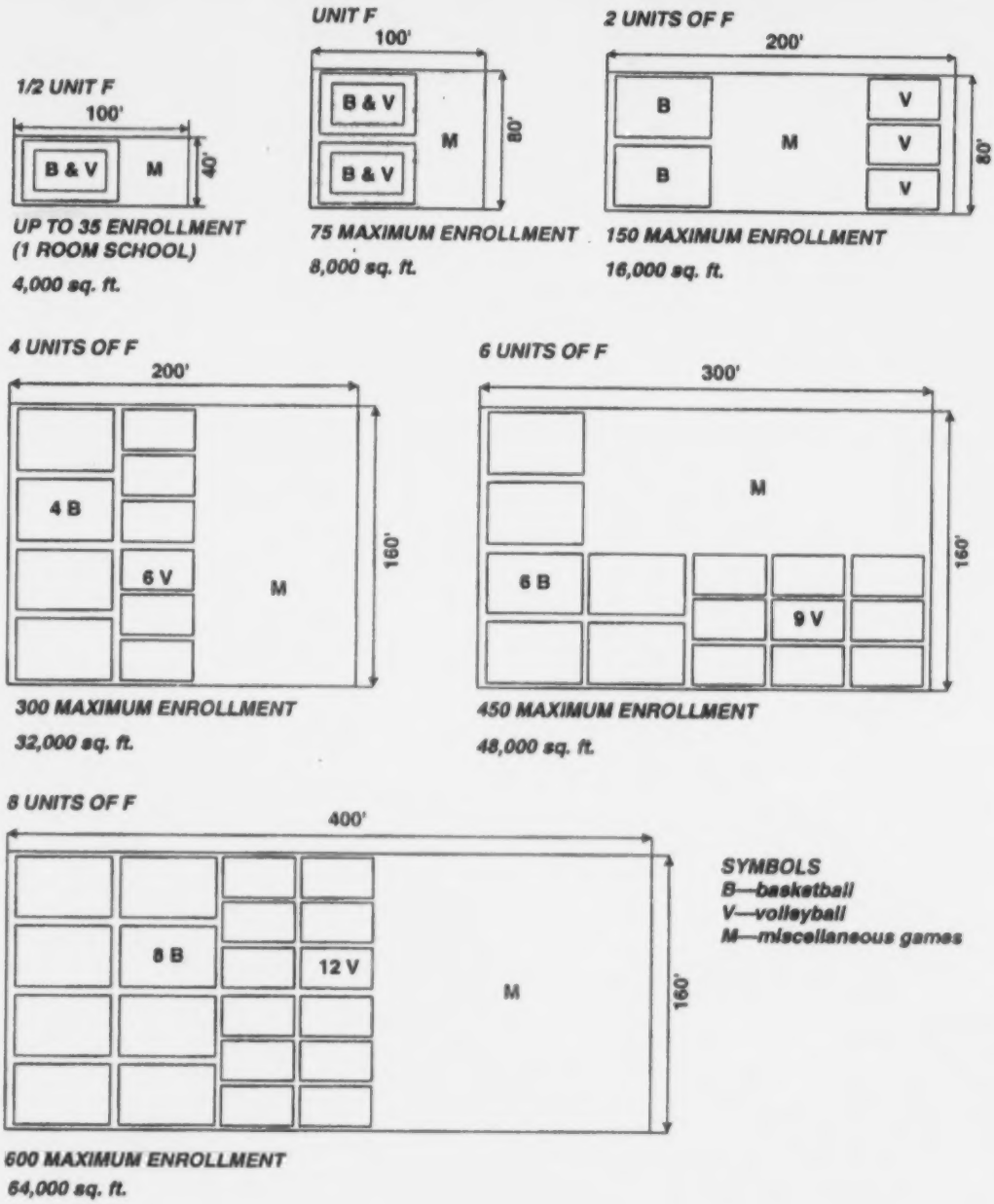
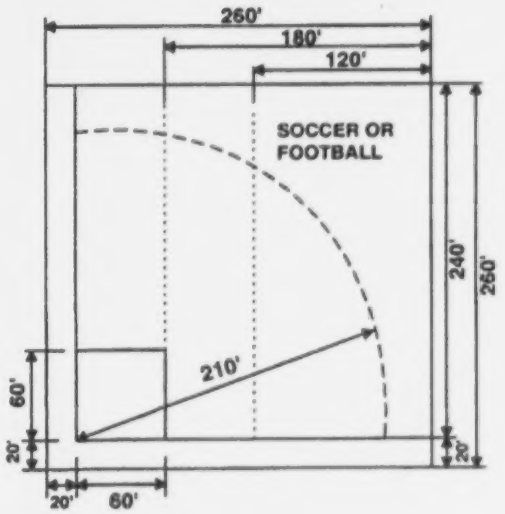


Fig. 11. Field and Hardcourt Areas for Grades 7 through 12



BASIC UNIT G

260' x 260' = 67,600 sq. ft.
1 SOFTBALL OR 1 FIELD AREA

BASIC UNIT H

260' x 460' = 119,600 sq. ft.
2 SOFTBALL OR 2 FIELD AREAS

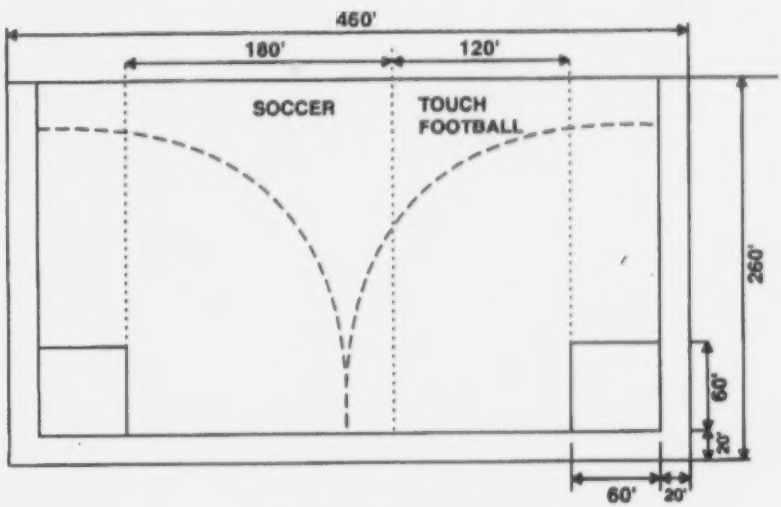
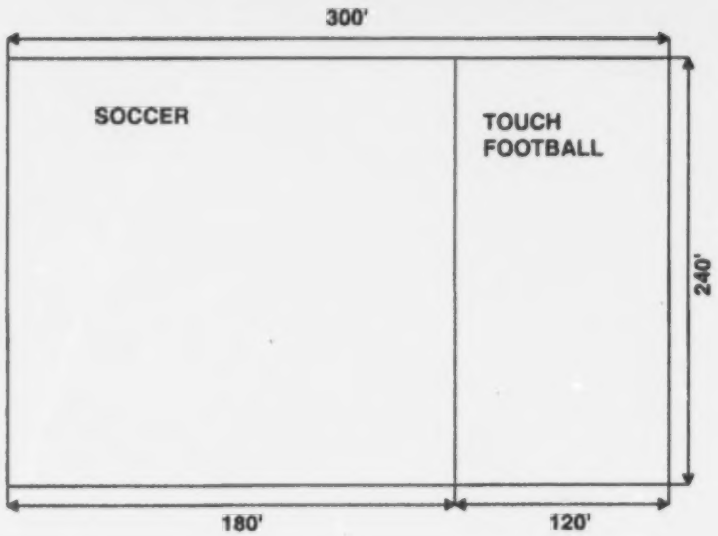


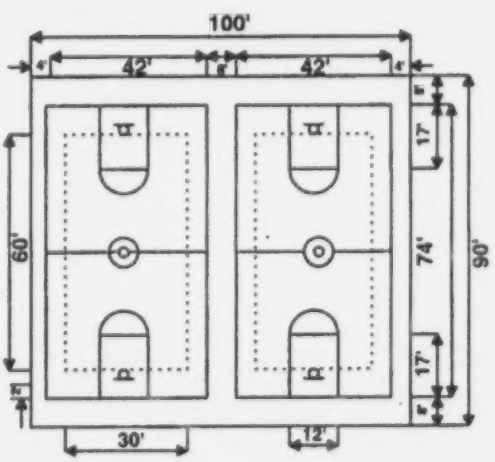
Fig. 12. Basic Unit I



BASIC UNIT I

240' x 300' = 72,000 sq. ft.
MULTIUSE FIELD AREA

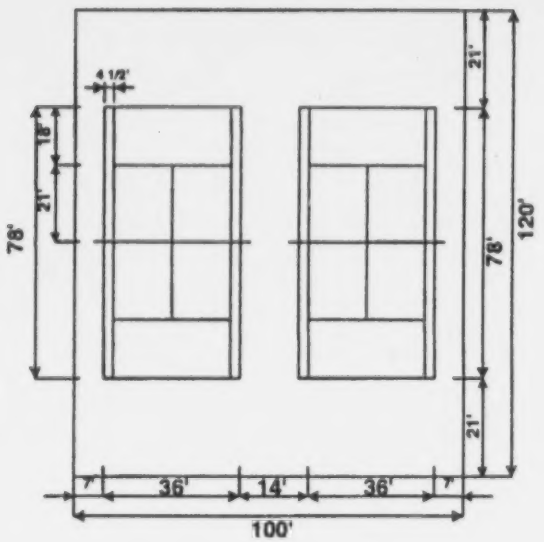
Fig. 13. Basic Unit J



BASIC UNIT J

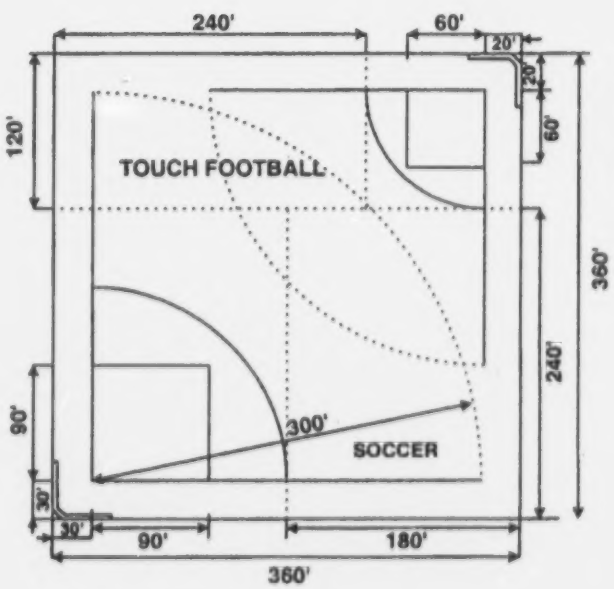
90' x 100' = 9,000 sq. ft.
BASKETBALL OR VOLLEYBALL

Fig. 14. Field and Hardcourt Areas for Grades 7 Through 12



BASIC UNIT K

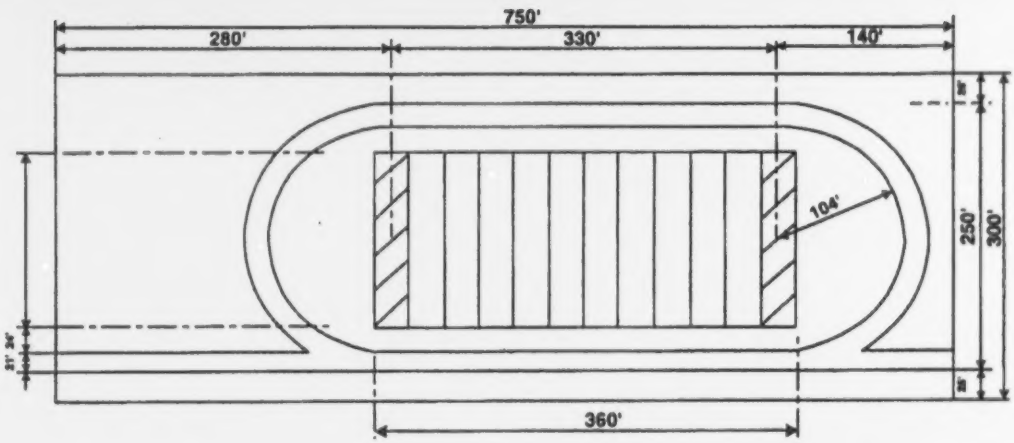
100' x 120' = 12,000 sq. ft.
2 TENNIS COURTS



BASIC UNIT L

360' x 360' = 129,600 sq. ft.
1 BASEBALL AND SOFTBALL
OR 2 FIELD AREAS

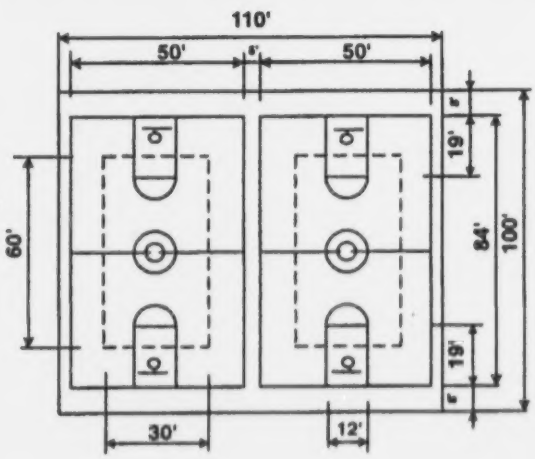
Fig. 15. Basic Unit M



BASIC UNIT M

300' x 750' = 225,000 sq. ft.
FOOTBALL & TRACK

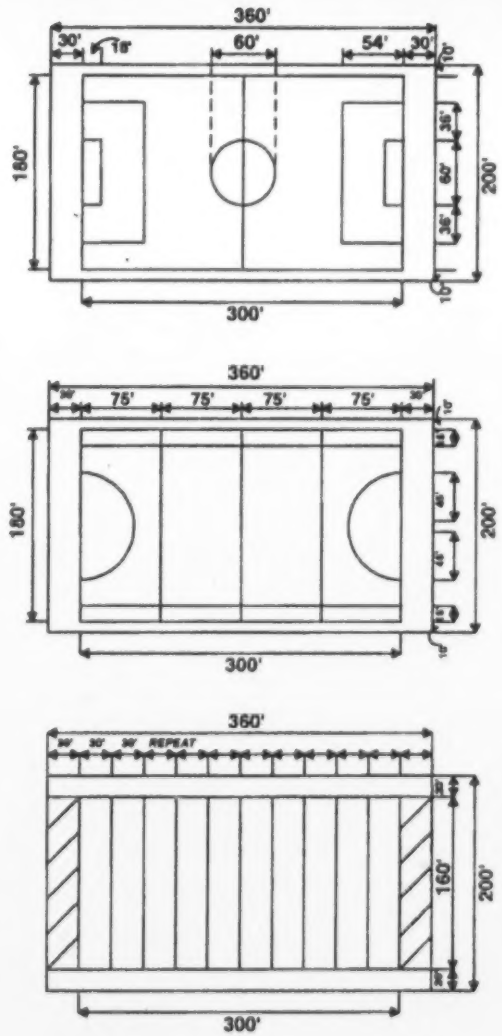
Fig. 16. Basic Unit N



BASIC UNIT N

100' x 110' = 11,000 sq. ft.
BASKETBALL OR VOLLEYBALL

Fig. 17. Field and Hardcourt Areas for Grades 7 Through 12



BASIC UNIT O

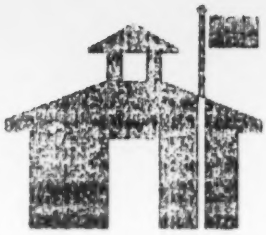
200' x 360' = 72,000 sq. ft.

SOCCER

FIELD HOCKEY

TOUCH FOOTBALL

Basic Unit P, an apparatus area, is a space module of 1,000 square feet. The architect may design the area according to the dimensions of the particular type of apparatus to be installed as long as the total area does not exceed 1,000 square feet. Basic Unit P provides space for up to 75 students in grades six through twelve. (See Tables 4, 5, and 6 for additional basic units needed for enrollments beyond 75 in the upper grades.)



Section 4

Procedures for Developing a Site Plan

Step 1

Obtain a topographical survey of the site. The survey of a school site must include the following information:

1. Title of survey, property location, certification, and date
2. Scale and compass orientation
3. Tract boundary lines, courses, and distances
4. Names of property owners whose property abuts the site
5. Benchmark with assumed elevation
6. Names and locations of all existing road right-of-ways on or near the tract
7. Location of all existing structures on the site, including buildings, foundations, bridges, wells, cisterns, walls and fences, and rock outcroppings
8. Location, type, size, and flow of all existing storm and sanitary sewers on or continuous to the tract, including top and invert elevations of all manholes, and inlet and invert elevations of other drainage structures
9. Location of roads, drives, curbs, gutters, steps, walks, paved areas, and the like, indicating types of material or surfacing
10. Location, type, and size of all water and gas mains, meter boxes, hydrants, and other appurtenances
11. Locations of all utility poles, telephone lines, and power lines, with indication of nearest leads either on-site or off-site; pertinent information and ownership of all utilities
12. Location of all swamps, springs, streams, drainage ditches, lakes, and other bodies of water; line of maximum floodplain if applicable
13. Outline of wooded areas; location of trees, identification of trees by type, and identification of trees with trunks over eight inches in diameter at waist height

14. Road elevation for all improved roads on or adjacent to property; improved gutter elevations on property line side at intervals of 50 feet
15. Elevations throughout the site sufficient to develop complete and thorough contour map

STEP 2

Make repeated visits to the site to gain a feeling for the character of the site, collect information, and begin a land-use analysis. Usually the architect takes a print of the topographical survey directly to the field. From actual on-the-site observations, she or he notes all pertinent information, such as views, sculptural land forms, the quality of the soil, trees, outcroppings, streams, and all other existing natural attributes, which might influence the site planning. This study allows the architect to visualize the site upon completion of the developed school.

STEP 3

Prepare diagrammatic studies based on all collected information and an understanding of the site, the educational program, and the facilities required for the finished school. It is necessary for the architect to prepare many diagrammatic studies to show the various possibilities. They are usually executed in rapid freehand sketches, which are seldom shown to the client; yet these studies are most critical in the planning process because conceptual ideas are developed during this phase.

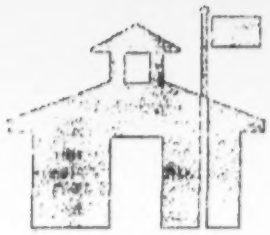
The architect can benefit by collaboration at this point with the clients, school planning specialists, landscape architects, engineers, and experts in various fields who, in a free interchange of ideas, generally contribute such specific information that the best plan concepts evolve almost spontaneously.

STEP 4

The playfields and hardcourt areas used in this site plan contain the correct number of facilities at the correct scale as recommended by the site requirement tables. The symbols used correspond to those in the tables.

Develop a refined site plan. (The architect should not proceed beyond step 3 until the school buildings are planned in considerable detail.)

1 Kindergarten
2 Grades 1 and 2
3 Grades 3 and 4
4 Grades 5 and 6
5 Multipurpose and administration
6 Parking
7 Bus loading area
8 Kindergarten play yard
9 Expansion
10 Powerline setback
a Playfields/Grades 1, 2, 3
b Hardcourts/Grades 1, 2, 3
d Playfields/Grades 4, 5, 6
f Hardcourts/Grades 4, 5, 6



Appendix

Site Requirements for Very Large Schools

Typically, school districts plan the sizes of schools on the basis of the following maximum enrollments:

Grades	Enrollment
One, two, and three	600
Four, five, and six	600
Seven and eight	1,200
Nine through twelve	2,400

The maximums have remained unchanged through the years. With some exceptions, most schools have not exceeded those sizes in the initial planning. In the last decade, however, there has been a trend toward larger schools and a consequent need to adjust the site requirement tables beyond the maximum enrollments indicated above.

The trend toward larger schools is most apparent in the areas that can least afford the large size—urban areas where land is the most scarce and costly. In those instances the site requirement tables for large schools may be used in reference to the Leroy F. Greene School Facilities Act of 1998. Under that Act a school district may be deemed qualified for a grant for excessive construction costs due to urban location and security requirements and for designation as an impacted site as defined in Section 1859.74.1 of the *California Code of Regulations*. A similar provision for an additional grant is contained in Section 1859.73, related to multilevel construction on impacted sites.

To determine whether a site is impacted, the school district needs to know the percentage of the site size compared with the size recommended by the California Department of Education for the master planned project. The tables of expanded site sizes may be useful in providing this information. Although the School Facilities Planning

Division does not recommend exceedingly large schools, the division recognizes that some districts wish to build very large schools that exceed the requirements detailed in the tables. Therefore, requirements for expanded sites are provided in this appendix.

Determining the size of a new school is an important decision for a school district and deserves serious thought. In an effort to help school districts, the California Department of Education provided information about school size in a publication titled *Schools for the Twenty-first Century* (1990, 15–17).

The issue of the size of a school has been the subject of much research; there are no clear-cut solutions. Researchers arrived at two conclusions:

- The optimal school size is one that supports the kind of education the community wants at a cost it can afford.
- The relationship between teachers and students is a primary concern. The school's structure, no matter what its size, must support that relationship.

Size per se is not the only factor or the most crucial one in determining a school's success. Other factors to be considered are the district's geographical characteristics, its tradition and history, the density and location of its student population, and local politics.

Large school districts, especially urban districts, tend to have larger schools than do small rural districts. What is large to one district may be small or medium-sized to another. School size is relative; however, most researchers, for purposes of analysis, classify the size of a school by the enrollment, as shown in Table A.1.

Table A.1 School Size Categories, by Grade Span and Enrollment

	Grade span and enrollment		
School Size	*K–5 or K–6*	*6–8 or 7–8*	*9–12*
Very Small	1–100	1–300	1–600
Small	101–300	301–700	601–900
Medium	301–600	701–1,200	901–1,500
Large	601–1,000	1,201–1,500	1,501–2,400
Very Large	1,000+	1,500+	2,400+

A school district should be large enough to include an area equivalent to a well-identified community of people who have some degree of interaction and share common interests. Some union high school districts that embrace more than one community have found it desirable to build more schools, each serving a different community of people within the district. If the needs of a community have not been adequately provided for, the community might withdraw from the school district to establish its own high school. If a single high school can meet the needs of several communities, the communities generally have chosen to retain one larger school.

Many educators have learned through experience that the very large school has some disadvantages. One of these is its impersonal character, which makes it difficult for students and staff to know one another well enough to create a sense of belonging. The primary strategy for minimizing this disadvantage is to break the school into various "houses" or schools-within-a school.

In very large schools many students find it difficult to participate in student government, sports, and other activities. In smaller schools more students participate in activities, and close relationships between students and staff can be more easily achieved.

A close relationship between the school and the home improves the school's efficiency. Very large schools impede close understanding and cooperation between school and home; they also often involve several communities whose characters and educational needs differ.

Furthermore, coordinating an instruction program is more difficult in a very large high school. Instructional departments tend to become more and more self-contained, and the desirable integration among specialized courses occurs less frequently. Both very large schools and very small schools may cost more per student to operate.

Research on the relationship between academic achievement and school size is inconclusive. Some studies have found no relationship; others have found that larger schools—within reasonable size limits—produce better results.

Additional factors to be considered are students' circulation patterns and congestion in areas such as libraries, cafeterias, and hallways. These problems are more difficult to overcome in very large schools, even those with staggered schedules.

Table A.2 Requirements for Expanded Sites, Grades One Through Six

(Schools with more than six classrooms with [illegible])

	Grades one, two, and three				Grades four, five, and six			
	Enrollment				*Enrollment*			
	601 to 750	*751 to 900*	*901 to 1,050*	*1,051 to 1,200*	*601 to 750*	*751 to 900*	*901 to 1,050*	*1,051 to 1,200*
Type of outdoor facility	*Number of facilities required*				*Number of facilities required*			
A Field area 90' × 120'	4	5	5	6				
B Hardcourt area 60' × 75'	10	12	14	16				
C Apparatus area (3,200 sq. ft.)	6	7	8	9	4	4	5	5
D Field area 180' × 180'					4	4	5	5
E Field area 120' × 180'					5	5	6	6
F Hardcourt area 80' × 100'					10	12	14	16
Percentage factor for layout	10	10	10	10	10	10	10	10
Area use	*Usable acres required*				*Usable acres required*			
Physical education	2.7	3.3	3.6	4.2	8.3	8.7	10.6	11.0
Buildings and grounds	3.0	3.7	4.3	4.9	3.0	3.7	4.3	4.9
Parking and roads	0.5	0.6	0.7	0.8	0.5	0.6	0.7	0.8
Total acres without CSR	6.2	7.6	8.6	9.9	11.8	13.0	15.6	16.7
Class size reduction	*Usable acres required*				*Usable acres required*			
Added acreage for buildings and grounds	1.0	1.1	1.2	1.4	1.0	1.1	1.2	1.4
Added acreage for parking and roads	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.4
Total acres with CSR	7.5	9.0	10.2	11.7	13.1	14.4	17.2	18.5

Note: For data on kindergarten, see Table 3 in the text.

Table A.3 Requirements for Expanded Sites, Grades Six Through Nine

	Any combination of grades six, seven, and eight (without football/track facilities)				Any combination of grades seven, eight, and nine (with football/track facilities)			
	Enrollment				*Enrollment*			
	1,201 to 1,400	*1,401 to 1,600*	*1,601 to 1,800*	*1,801 to 2,000*	*1,201 to 1,400*	*1,401 to 1,600*	*1,601 to 1,800*	*1,801 to 2,000*
Type of outdoor facility	*Number of facilities required*				*Number of facilities required*			
G Field area 260' × 260'		1	1	1		1		
H Field area 260' × 460'	2	2	2	2	1	1	2	2
I Field area 240' × 300'	1	1	1	1				
J Hardcourt area 90' × 100'	7	8	9	10	7	8	9	10
K Hardcourt area 100' × 120'	4	5	6	7	4	5	6	7
L Field area 360' × 360'					1	1	1	1
M Field area 300' × 750'					1	1	1	1
P Apparatus area (1,000 sq. ft.)	5	6	7	8	5	6	7	8
Percentage factor for layout	15	10	10	10	20	15	15	15
Area use	*Usable acres required*				*Usable acres required*			
Physical education	11.3	13.0	13.6	14.2	16.3	17.9	19.9	20.5
Buildings and grounds	7.7	8.8	9.9	11.0	7.7	8.8	9.9	11.0
Parking and roads	0.9	1.0	1.2	1.3	0.9	1.0	1.2	1.3
Total acres without CSR	19.9	22.8	24.7	26.5	24.9	27.7	31.0	32.8
Class size reduction	*Usable acres required*				*Usable acres required*			
Added acreage for buildings and grounds	1.6	1.9	2.1	2.3	1.6	1.9	2.1	2.3
Added acreage for parking and roads	0.5	0.5	0.6	0.6	0.5	0.5	0.6	0.6
Total acres with CSR	22.0	25.2	27.4	29.4	27.0	30.1	33.7	35.7

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Table A.4 Requirements for Expanded Sites, Grades Nine Through Twelve

Any combination of grades nine, ten, eleven, and twelve

	Enrollment							
	2,401 to 2,600	*2,601 to 2,800*	*2,801 to 3,000*	*3,001 to 3,200*	*3,201 to 3,400*	*3,401 to 3,600*	*3,601 to 3,800*	*3,801 to 4,000*
Type of outdoor facility	*Number of facilities required*							
H Field area 260' × 460'	3	3	3	3	3	3	3	3
K Hardcourt area 100' × 120'	4	5	5	5	5	6	6	6
L Field area 360' × 360'	2	2	2	2	2	2	2	2
M Field area 300' × 750'	1	1	1	1	1	1	1	1
N Hardcourt area 100' × 110'	8	8	9	9	9	10	10	10
O Field area 260' × 360'	2	2	2	2	2	2	3	3
P Apparatus area (1,000 sq. ft.)	8	8	9	10	10	11	11	12
Percentage factor for layout	10	10	10	10	10	10	10	10
Area use	*Usable acres required*							
Physical education	28.6	28.9	29.2	29.2	29.2	29.8	31.6	31.6
Buildings and grounds	16.5	17.7	19.0	20.3	21.5	22.8	24.1	25.3
Parking and roads	13.2	14.2	15.3	16.3	17.3	18.3	19.4	20.3
Total acres without CSR	58.3	60.8	63.5	65.8	68.0	70.9	75.1	77.2
Class size reduction	*Usable acres required*							
Added acreage for buildings and grounds	2.5	2.8	3.0	3.2	3.4	3.5	3.7	3.9
Added acreage for parking and roads	0.7	0.8	0.8	0.9	1.0	1.0	1.0	1.1
Total acres with CSR	61.5	64.4	67.3	69.9	72.4	75.4	79.8	82.2

Note: If field area L, Baseball Field, includes bleachers and dugouts, the site must be increased 0.3 acre.
If field area M, Football Field and Track, includes a stadium, the site must be increased 1.7 acres.
If the school program includes aquatics and requires both swimming and diving pools, the site must be increased 0.6 acre.

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